



# SPORTON International Inc.

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## FCC RADIO TEST REPORT

Applicant's company	3Com Corporation
Applicant Address	350 Campus Drive, Marlborough, MA 01752-3064. U.S.A.
FCC ID	O9C-WL602

Product Name	3Com Wireless 11n Cable/DSL Firewall Router
Brand Name	3Com
Model Name	WL-602
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Apr. 15, 2008
Final Test Date	May. 30 2008
Submission Type	Original Equipment



### Statement

**Test result included in this report is for the Draft n and 802.11b/g part of the product.**

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart C**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.



## Table of Contents

<b>1. CERTIFICATE OF COMPLIANCE .....</b>	<b>1</b>
<b>2. SUMMARY OF THE TEST RESULT .....</b>	<b>2</b>
<b>3. GENERAL INFORMATION .....</b>	<b>3</b>
3.1. Product Details.....	3
3.2. Accessories.....	5
3.3. Table for Filed Antenna.....	6
3.4. Table for Carrier Frequencies .....	7
3.5. Table for Test Modes .....	8
3.6. Table for Testing Locations.....	9
3.7. Table for Supporting Units .....	9
3.8. Table for Parameters of Test Software Setting .....	10
3.9. Test Configurations .....	11
<b>4. TEST RESULT .....</b>	<b>13</b>
4.1. AC Power Line Conducted Emissions Measurement.....	13
4.2. Maximum Conducted Output Power Measurement.....	21
4.3. Power Spectral Density Measurement .....	34
4.4. 6dB Spectrum Bandwidth Measurement .....	43
4.5. Radiated Emissions Measurement .....	52
4.6. Band Edge Emissions Measurement .....	84
4.7. Antenna Requirements .....	93
<b>5. LIST OF MEASURING EQUIPMENTS .....</b>	<b>94</b>
<b>6. TEST LOCATION.....</b>	<b>95</b>
<b>7. TAF CERTIFICATE OF ACCREDITATION .....</b>	<b>96</b>
<b>APPENDIX A. PHOTOGRAPHS OF EUT.....</b>	<b>A1 ~ A18</b>
<b>APPENDIX B. TEST PHOTOS.....</b>	<b>B1 ~ B6</b>
<b>APPENDIX C. MAXIMUM PERMISSIBLE EXPOSURE.....</b>	<b>C1 ~C3</b>





## 1. CERTIFICATE OF COMPLIANCE

Product Name : 3Com Wireless 11n Cable/DSL Firewall Router  
Brand Name : 3Com  
Model Name : WL-602  
Applicant : 3Com Corporation  
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Apr. 15, 2008 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

A handwritten signature in blue ink that reads 'Wayne Hsu 3.6.08'. The signature is written over a horizontal line.

Wayne Hsu

SPORTON INTERNATIONAL INC.

## 2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.207	AC Power Line Conducted Emissions	Complies	1.47 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	10.25 dB
4.3	15.247(e)	Power Spectral Density	Complies	18.42 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	3.46 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.50 dB
4.7	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	±8.5×10 <sup>-8</sup>	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7°C	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

### 3. GENERAL INFORMATION

#### 3.1. Product Details

##### Draft n

Items	Description
Product Type	WLAN (2TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	Power Adapter
Modulation	see the below table for draft n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for Draft n
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Channel Band Width (99%)	MCS8 (20MHz) : 17.60 MHz MCS8 (40MHz) : 36.08 MHz
Conducted Output Power	MCS8 (20MHz) : 19.75 dBm MCS8 (40MHz) : 19.51 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

##### 802.11b/g

Items	Description
Product Type	802.11b :WLAN (1TX, 1RX) 802.11g :WLAN (1TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	Power Adapter
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11g
Data Modulation	DSSS (BPSK / QPSK / CCK) ; OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	DSSS (1/ 2/ 5.5/11) ; OFDM (6/9/12/18/24/36/48/54)
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11
Channel Band Width (99%)	11b: 15.32 MHz ; 11g: 16.48 MHz
Conducted Output Power	11b: 18.62 dBm ; 11g: 16.50 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

**Antenna & Band width**

Antenna	Single (TX)		Two (TX)	
	20 MHz	40 MHz	20 MHz	40 MHz
Band width Mode				
802.11b	V	X	X	X
802.11g	V	X	X	X
Draft n	X	X	V	V

**Draft n spec**

MCS Index	Nss	Modulation	R	NBPS	NCBPS		NDBPS		Datarate(Mbps)	
					20MHz	40MHz	20MHz	20MHz	400nsGI	
									20MHz	40MHz
0	1	BPSK	1/2	1	52	108	7.200	7.200	6.5	13.5
1	1	QPSK	1/2	2	104	216	14.400	14.400	13.0	27.0
2	1	QPSK	3/4	2	104	216	21.700	21.700	19.5	40.5
3	1	16-QAM	1/2	4	208	432	28.900	28.900	26.0	54.0
4	1	16-QAM	3/4	4	208	432	43.300	43.300	39.0	81.0
5	1	64-QAM	2/3	6	312	648	57.800	57.800	52.0	108.0
6	1	64-QAM	3/4	6	312	648	65.000	65.000	58.5	121.5
7	1	64-QAM	5/6	6	312	648	72.200	72.200	65.0	135.0
8	2	BPSK	1/2	1	104	216	14.444	14.444	13.0	27.0
9	2	QPSK	1/2	2	208	432	28.889	28.889	26.0	54.0
10	2	QPSK	3/4	2	208	432	43.333	43.333	39.0	81.0
11	2	16-QAM	1/2	4	416	864	57.778	57.778	52.0	108.0
12	2	16-QAM	3/4	4	416	864	86.667	86.667	78.0	162.0
13	2	64-QAM	2/3	6	624	1296	115.556	115.556	104.0	216.0
14	2	64-QAM	3/4	6	624	1296	130.000	130.000	117.0	243.0
15	2	64-QAM	5/6	6	624	1296	144.444	144.444	130.0	270.0

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPS	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	guard interval

### 3.2. Accessories

Power	Brand	Model	Rating
Adapter 1	DVE	DVS-150A10AUS	Input:100-120VAC, 50-60Hz, 0.7A Output:15VDC, 1A
Adapter 2	DVE	DSA-15P-12US 120120	Input:100-240VAC, 50-60Hz, 0.5A Output:12VDC, 1A



### 3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Remark
A (1)	Arcadyan	120300025300J	Dipole Antenna	N/A	2	TX / RX Ant.
B (2)	Arcadyan	120300014200J	PIFA Antenna	N/A	2	RX Ant.
C (0)	Arcadyan	120300025200J	Dipole Antenna	N/A	2	TX / RX Ant.

Note: The EUT has three antennas(2TX, 3RX).

For 802.11b mode:

Antenna C can be used as transmitting antenna and receiving antenna.

For 802.11g mode:

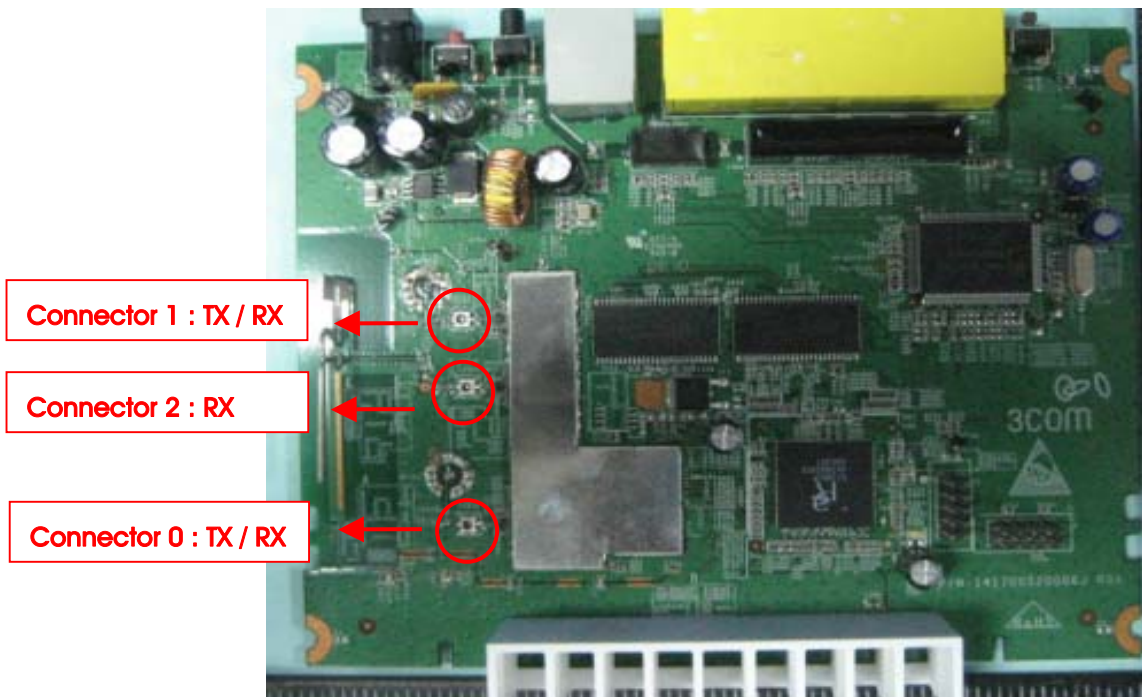
Antenna C can be used as transmitting antenna.

Both Antenna C and Antenna A can be used as receiving antenna.

For Draft n mode:

Ant. A and Ant. C will transmit the same signal simultaneously.

Ant. A, Ant. B and Ant. C will receive the same signal simultaneously.



### 3.4. Table for Carrier Frequencies

There are two bandwidth systems for draft n.

For both 20MHz bandwidth systems, use Channel 1~Channel 11.

For both 40MHz bandwidth systems, use Channel 3~Channel 9.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400~2483.5MHz	1	2412 MHz	7	2442 MHz
	2	2417 MHz	8	2447 MHz
	3	2422 MHz	9	2452 MHz
	4	2427 MHz	10	2457 MHz
	5	2432 MHz	11	2462 MHz
	6	2437 MHz		

### 3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel	Antenna
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Peak Conducted Output Power	MCS8/20MHz	13 Mbps	1/6/11	A / C / A+C
	MCS8/40MHz	27 Mbps	3/6/9	A / C / A+C
	11b/BPSK	1 Mbps	1/6/11	C
	11g/BPSK	6 Mbps	1/6/11	C
Power Spectral Density 6dB Spectrum Bandwidth	MCS8/20MHz	13 Mbps	1/6/11	A / C / A+C
	MCS8/40MHz	27 Mbps	3/6/9	A / C / A+C
	11b/BPSK	1 Mbps	1/6/11	C
	11g/BPSK	6 Mbps	1/6/11	C
Radiated Emissions 9kHz~1GHz	Normal Link	-	-	-
Radiated Emissions 1GHz~10 <sup>th</sup> Harmonic	MCS8/20MHz	13 Mbps	1/6/11	A / C / A+C
	MCS8/40MHz	27 Mbps	3/6/9	A / C / A+C
	11b/BPSK	1 Mbps	1/6/11	C
	11g/BPSK	6 Mbps	1/6/11	C
Band Edge Emissions	MCS8/20MHz	13 Mbps	1/11	A / C / A+C
	MCS8/40MHz	27 Mbps	3/9	A / C / A+C
	11b/BPSK	1 Mbps	1/11	C
	11g/BPSK	6 Mbps	1/11	C

Note:

The following test modes were performed for all tests:

Mode 1: EUT + Adapter 1

Mode 2: EUT + Adapter 2

### 3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH03-HY	SAC	Hwa Ya	101377	IC 4088	-
CO04-HY	Conduction	Hwa Ya	101377	IC 4088	-
TH01-HY	OVEN Room	Hwa Ya	-	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

Please refer section 6 for Test Site Address.

### 3.7. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	D400	E2K24GBRL
Notebook	DELL	D505	E2K24GBRL
Notebook	DELL	1200	E2K4965AGNM
Switch Hub	N/A	EtherHub-16	CFG813003329

### 3.8. Table for Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

#### Power Parameters of Draft n MCS8 20MHz

Test Software Version	QA		
Frequency	2412 MHz	2437 MHz	2462 MHz
Draft n Ant. A	0B	0D	0F
Draft n Ant. C	0D	0F	10

#### Power Parameters of Draft n MCS8 40MHz

Test Software Version	QA		
Frequency	2422 MHz	2437 MHz	2452 MHz
Draft n Ant. A	0A	0D	0D
Draft n Ant. C	0C	0F	0E

#### Power Parameters of IEEE 802.11b/g

Test Software Version	QA		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b Ant. C	0B	0D	0F
IEEE 802.11g Ant. C	0B	0D	0F

During the test, "Ping.exe" under WIN XP was executed to link with the remote workstation to receive and transmit signal by LAN and WLAN

Executed "ping.exe" to link with the remote workstation to receive and transmit signal by LAN and WLAN.

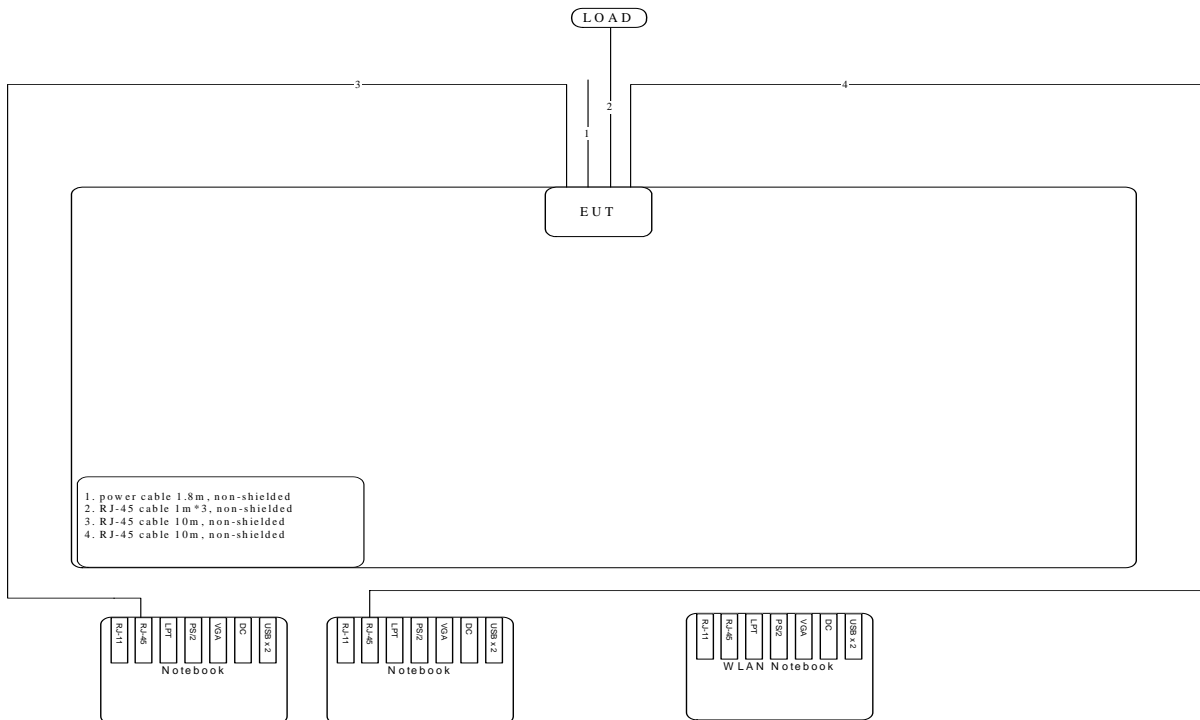
At the same time, "QA" was executed the test program to control the EUT continuously transmit RF signal.

### 3.9. Test Configurations

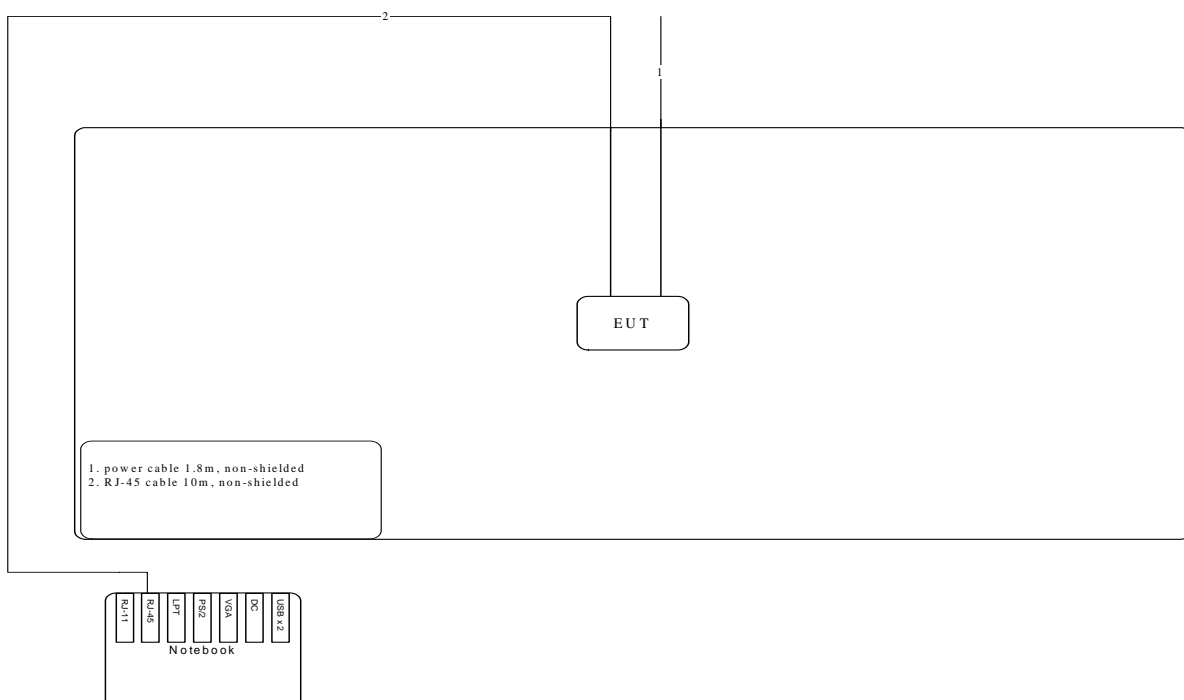
#### 3.9.1. Radiation Emissions Test Configuration

Test Configuration: 30KHz~1GHz

Test Mode: Mode 1 / Mode 2

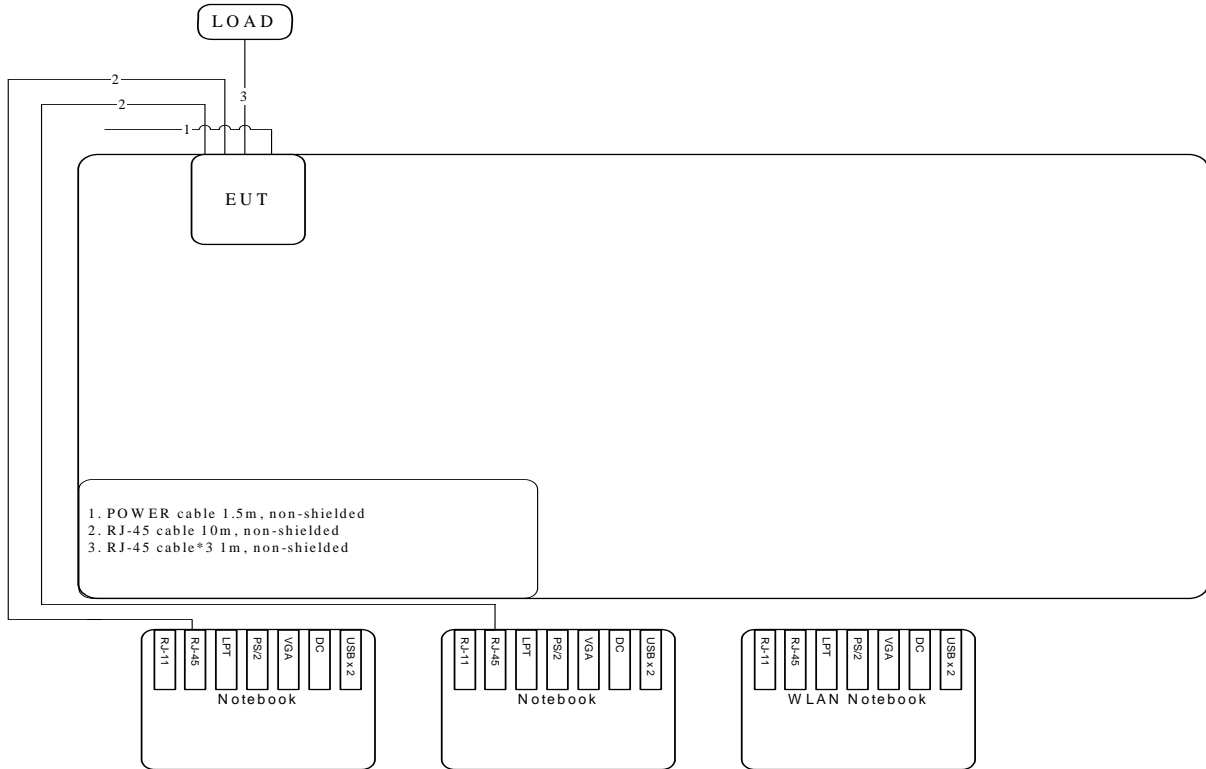


Test Configuration: above 1GHz



### 3.9.2. AC Power Line Conduction Emissions Test Configuration

Test Mode: Mode 1 / Mode 2



## 4. TEST RESULT

### 4.1. AC Power Line Conducted Emissions Measurement

#### 4.1.1. Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

#### 4.1.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

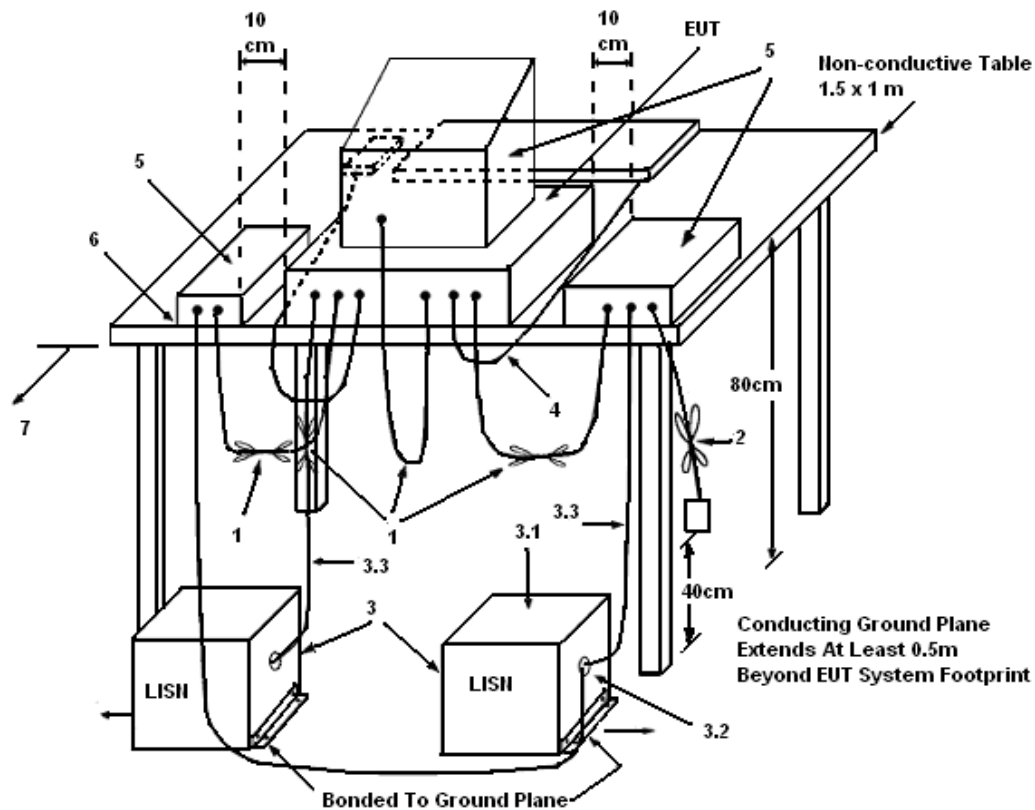
Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

#### 4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.



#### 4.1.4. Test Setup Layout



#### LEGEND:

- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.
  - (3.1) All other equipment powered from additional LISN(s).
  - (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
  - (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

#### 4.1.5. Test Deviation

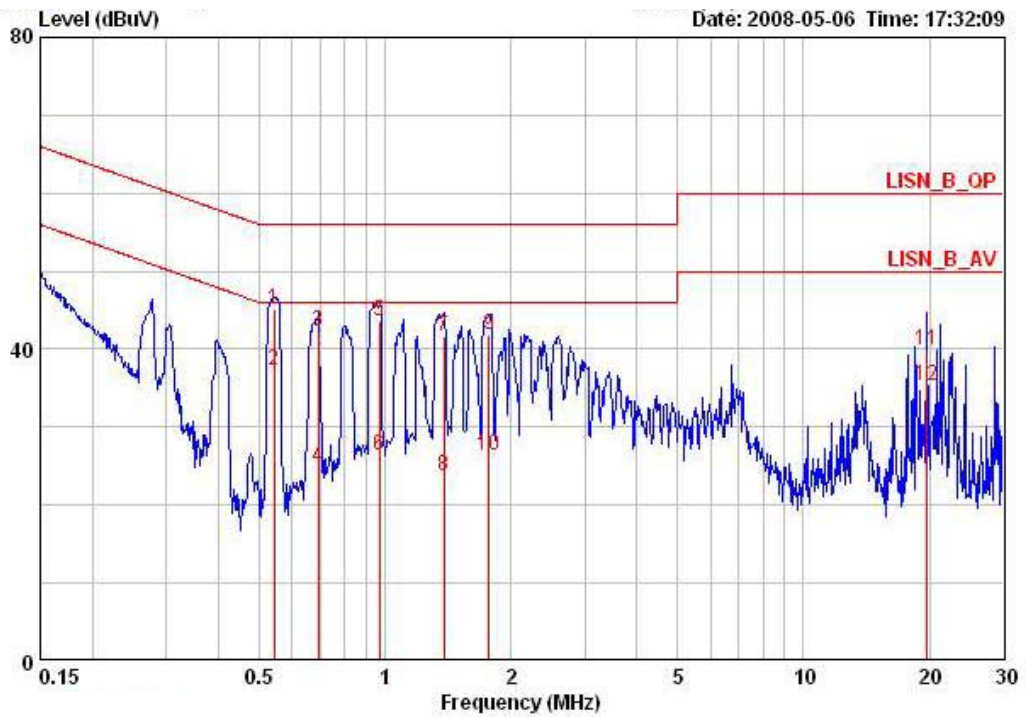
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

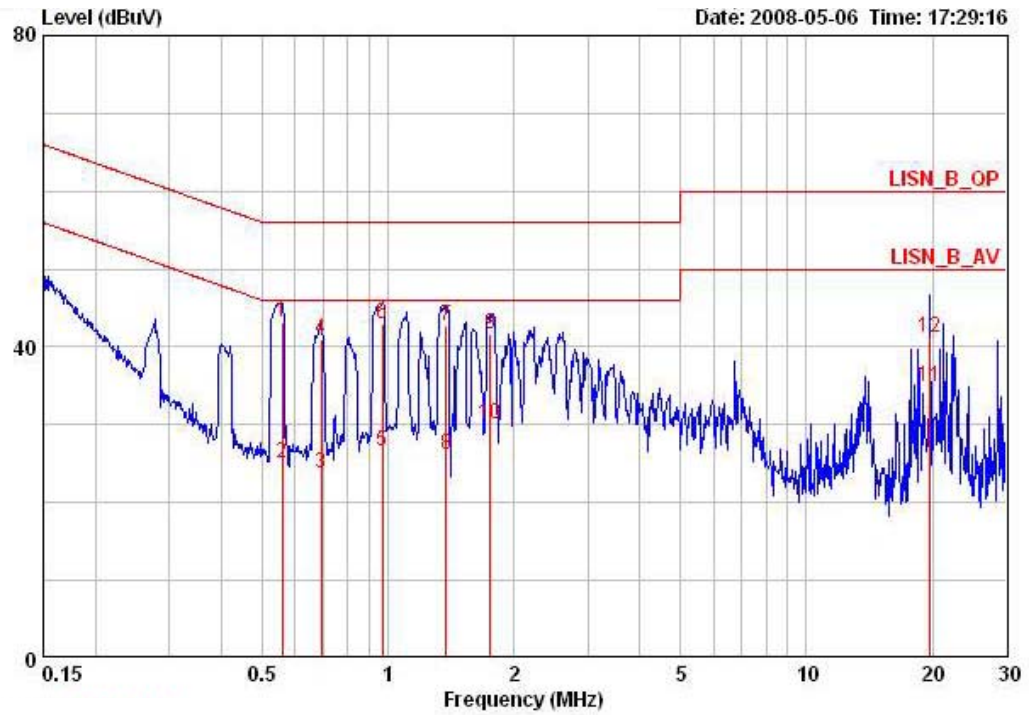
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23°C	Humidity	54%
Test Engineer	Rex Chiu	Phase	Line
Configuration	Normal Link / Mode 1		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.54355	45.21	-10.80	56.00	44.93	0.08	0.20	QP
2	0.54355	37.31	-8.70	46.00	37.03	0.08	0.20	AVERAGE
3	0.69357	42.23	-13.77	56.00	41.98	0.05	0.20	QP
4	0.69357	24.84	-21.16	46.00	24.59	0.05	0.20	AVERAGE
5	0.96840	43.51	-12.50	56.00	43.30	0.01	0.20	QP
6	0.96840	26.37	-19.64	46.00	26.16	0.01	0.20	AVERAGE
7	1.381	41.63	-14.37	56.00	41.51	0.00	0.12	QP
8	1.381	23.79	-22.21	46.00	23.67	0.00	0.12	AVERAGE
9	1.772	41.88	-14.12	56.00	41.72	0.00	0.16	QP
10	1.772	26.40	-19.60	46.00	26.24	0.00	0.16	AVERAGE
11	19.706	39.81	-20.19	60.00	39.21	0.10	0.50	QP
12	19.706	35.27	-14.73	50.00	34.67	0.10	0.50	AVERAGE

Temperature	23°C	Humidity	54%
Test Engineer	Rex Chiu	Phase	Neutral
Configuration	Normal Link / Mode 1		

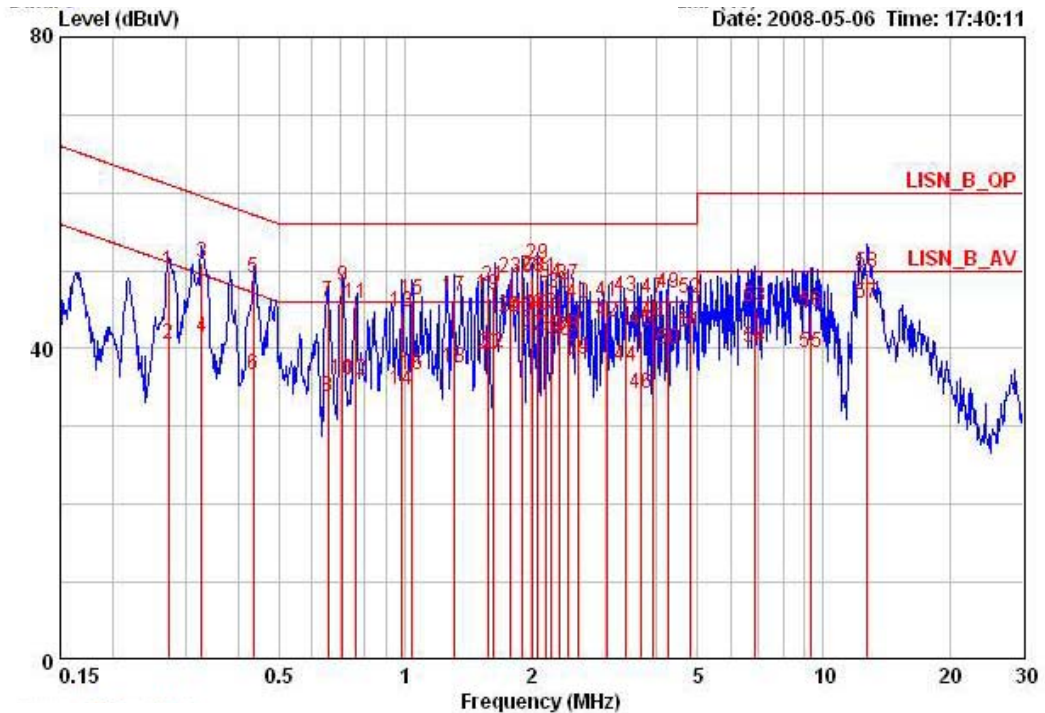


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.55815	43.14	-12.86	56.00	42.84	0.10	0.20	QP
2	0.55815	25.16	-20.84	46.00	24.86	0.10	0.20	AVERAGE
3	0.69357	23.82	-22.18	46.00	23.52	0.10	0.20	AVERAGE
4	0.69357	40.97	-15.03	56.00	40.67	0.10	0.20	QP
5	0.96840	26.68	-19.32	46.00	26.38	0.10	0.20	AVERAGE
6	0.96840	43.01	-12.99	56.00	42.71	0.10	0.20	QP
7	1.374	42.66	-13.34	56.00	42.44	0.10	0.12	QP
8	1.374	26.22	-19.78	46.00	26.00	0.10	0.12	AVERAGE
9	1.753	41.73	-14.27	56.00	41.48	0.10	0.15	QP
10	1.753	30.16	-15.84	46.00	29.91	0.10	0.15	AVERAGE
11	19.706	34.87	-15.13	50.00	34.27	0.10	0.50	AVERAGE
12	19.706	41.09	-18.91	60.00	40.49	0.10	0.50	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

Temperature	23°C	Humidity	54%
Test Engineer	Rex Chiu	Phase	Line
Configuration	Normal Link / Mode 2		

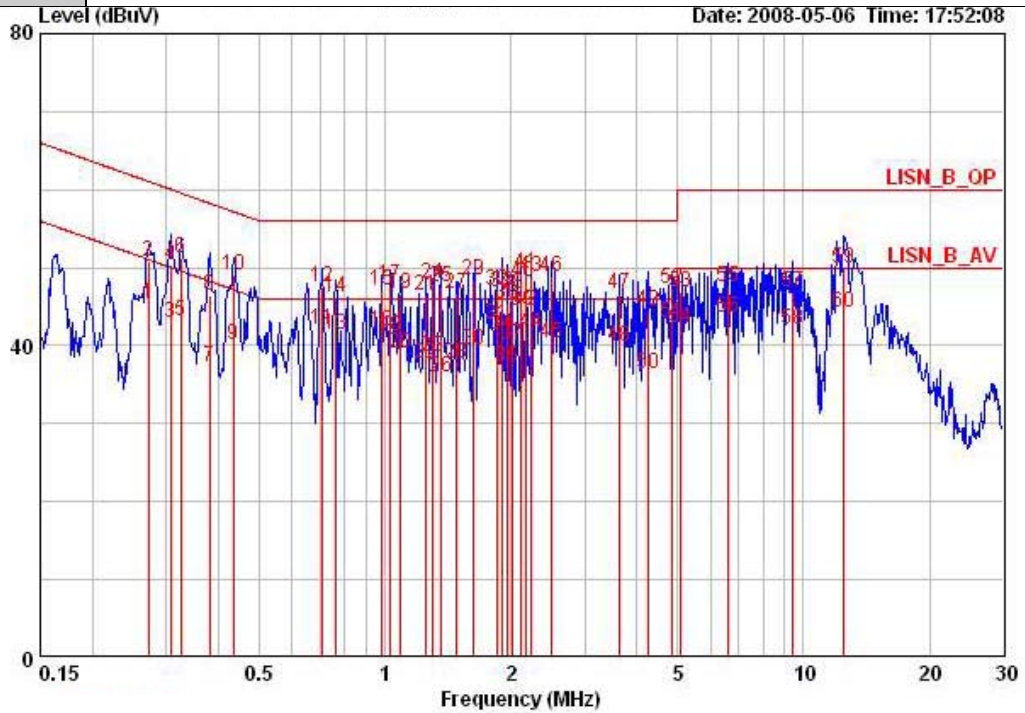


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.27152	49.91	-11.16	61.07	49.61	0.10	0.20	QP
2	0.27152	40.61	-10.46	51.07	40.31	0.10	0.20	AVERAGE
3	0.32685	51.11	-8.42	59.53	50.81	0.10	0.20	QP
4	0.32685	41.48	-8.05	49.53	41.18	0.10	0.20	AVERAGE
5	0.43511	49.02	-8.13	57.15	48.73	0.09	0.20	QP
6	0.43511	36.62	-10.53	47.15	36.33	0.09	0.20	AVERAGE
7	0.65430	45.99	-10.02	56.00	45.73	0.06	0.20	QP
8	0.65430	33.77	-12.24	46.00	33.51	0.06	0.20	AVERAGE
9	0.70842	48.02	-7.99	56.00	47.77	0.05	0.20	QP
10	0.70842	35.91	-10.10	46.00	35.66	0.05	0.20	AVERAGE
11	0.76102	45.81	-10.19	56.00	45.57	0.04	0.20	QP
12	0.76102	35.92	-10.08	46.00	35.68	0.04	0.20	AVERAGE
13	0.98391	44.63	-11.37	56.00	44.43	0.00	0.20	QP
14	0.98391	34.63	-11.37	46.00	34.43	0.00	0.20	AVERAGE
15	1.037	46.32	-9.68	56.00	46.13	0.00	0.19	QP
16	1.037	36.52	-9.48	46.00	36.33	0.00	0.19	AVERAGE
17	1.310	46.75	-9.25	56.00	46.62	0.00	0.13	QP
18	1.310	37.47	-8.53	46.00	37.34	0.00	0.13	AVERAGE
19	1.579	46.97	-9.03	56.00	46.85	0.00	0.12	QP
20	1.579	39.31	-6.69	46.00	39.19	0.00	0.12	AVERAGE
21	1.631	47.98	-8.02	56.00	47.85	0.00	0.13	QP
22	1.631	39.52	-6.48	46.00	39.39	0.00	0.13	AVERAGE



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
23	1.792	49.10	-6.90	56.00	48.94	0.00	0.16	QP
24	1.792	44.05	-1.95	46.00	43.89	0.00	0.16	AVERAGE
25	1.904	44.08	-1.92	46.00	43.90	0.00	0.18	AVERAGE
26	1.904	49.09	-6.91	56.00	48.91	0.00	0.18	QP
27	2.015	41.69	-4.31	46.00	41.49	0.00	0.20	AVERAGE
28	2.015	49.21	-6.79	56.00	49.01	0.00	0.20	QP
29	2.071	50.76	-5.24	56.00	50.56	0.00	0.20	QP
30	2.071	44.33	-1.67	46.00	44.13	0.00	0.20	AVERAGE
31	2.176	49.10	-6.90	56.00	48.90	0.00	0.20	QP
32	2.176	44.53	-1.47	46.00	44.33	0.00	0.20	AVERAGE
33	2.231	41.57	-4.43	46.00	41.37	0.00	0.20	AVERAGE
34	2.231	48.29	-7.71	56.00	48.09	0.00	0.20	QP
35	2.346	47.16	-8.84	56.00	46.96	0.00	0.20	QP
36	2.346	41.05	-4.95	46.00	40.85	0.00	0.20	AVERAGE
37	2.449	48.21	-7.79	56.00	48.01	0.00	0.20	QP
38	2.449	41.73	-4.27	46.00	41.53	0.00	0.20	AVERAGE
39	2.602	38.68	-7.32	46.00	38.48	0.00	0.20	AVERAGE
40	2.602	45.78	-10.22	56.00	45.58	0.00	0.20	QP
41	3.046	45.94	-10.06	56.00	45.73	0.00	0.21	QP
42	3.046	43.47	-2.53	46.00	43.26	0.00	0.21	AVERAGE
43	3.372	46.54	-9.46	56.00	46.27	0.00	0.27	QP
44	3.372	37.70	-8.30	46.00	37.43	0.00	0.27	AVERAGE
45	3.661	42.25	-13.75	56.00	41.95	0.00	0.30	QP
46	3.661	34.18	-11.82	46.00	33.88	0.00	0.30	AVERAGE
47	3.915	46.44	-9.56	56.00	46.14	0.00	0.30	QP
48	3.915	43.33	-2.67	46.00	43.03	0.00	0.30	AVERAGE
49	4.243	47.16	-8.84	56.00	46.86	0.00	0.30	QP
50	4.243	39.91	-6.09	46.00	39.61	0.00	0.30	AVERAGE
51	4.785	42.13	-3.87	46.00	41.82	0.01	0.30	AVERAGE
52	4.785	46.38	-9.62	56.00	46.07	0.01	0.30	QP
53	6.841	45.24	-14.76	60.00	44.86	0.05	0.33	QP
54	6.841	40.07	-9.93	50.00	39.69	0.05	0.33	AVERAGE
55	9.302	39.52	-10.48	50.00	39.13	0.09	0.30	AVERAGE
56	9.302	44.62	-15.38	60.00	44.23	0.09	0.30	QP
57	12.728	45.70	-4.30	50.00	45.20	0.10	0.40	AVERAGE
58	12.728	49.64	-10.36	60.00	49.14	0.10	0.40	QP

Temperature	23°C	Humidity	54%
Test Engineer	Rex Chiu	Phase	Neutral
Configuration	Normal Link / Mode 2		



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.27152	45.31	-5.76	51.07	44.94	0.17	0.20	AVERAGE
2	0.27152	50.83	-10.24	61.07	50.46	0.17	0.20	QP
3	0.30671	42.90	-7.16	50.06	42.55	0.15	0.20	AVERAGE
4	0.30671	50.41	-9.65	60.06	50.06	0.15	0.20	QP
5	0.32512	43.08	-6.49	49.57	42.75	0.13	0.20	AVERAGE
6	0.32512	51.26	-8.31	59.57	50.93	0.13	0.20	QP
7	0.38113	37.24	-11.01	48.25	36.94	0.10	0.20	AVERAGE
8	0.38113	46.48	-11.77	58.25	46.18	0.10	0.20	QP
9	0.43511	40.04	-7.11	47.15	39.74	0.10	0.20	AVERAGE
10	0.43511	49.09	-8.06	57.15	48.79	0.10	0.20	QP
11	0.70442	41.97	-4.03	46.00	41.67	0.10	0.20	AVERAGE
12	0.70442	47.60	-8.40	56.00	47.30	0.10	0.20	QP
13	0.75897	41.50	-4.50	46.00	41.20	0.10	0.20	AVERAGE
14	0.75897	46.28	-9.72	56.00	45.98	0.10	0.20	QP
15	0.97871	47.17	-8.83	56.00	46.87	0.10	0.20	QP
16	0.97871	41.89	-4.11	46.00	41.59	0.10	0.20	AVERAGE
17	1.032	47.84	-8.16	56.00	47.55	0.10	0.19	QP
18	1.032	41.28	-4.72	46.00	40.99	0.10	0.19	AVERAGE
19	1.088	46.68	-9.32	56.00	46.40	0.10	0.18	QP
20	1.088	38.99	-7.01	46.00	38.71	0.10	0.18	AVERAGE
21	1.249	46.45	-9.55	56.00	46.20	0.10	0.15	QP
22	1.249	37.69	-8.31	46.00	37.44	0.10	0.15	AVERAGE



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
23	1.304	38.55	-7.45	46.00	38.31	0.10	0.14	AVERAGE
24	1.304	48.06	-7.94	56.00	47.82	0.10	0.14	QP
25	1.359	47.42	-8.58	56.00	47.20	0.10	0.12	QP
26	1.359	35.99	-10.01	46.00	35.77	0.10	0.12	AVERAGE
27	1.479	46.72	-9.28	56.00	46.52	0.10	0.10	QP
28	1.479	37.80	-8.20	46.00	37.60	0.10	0.10	AVERAGE
29	1.628	48.34	-7.66	56.00	48.11	0.10	0.13	QP
30	1.628	39.38	-6.62	46.00	39.15	0.10	0.13	AVERAGE
31	1.848	42.68	-3.32	46.00	42.41	0.10	0.17	AVERAGE
32	1.848	47.14	-8.86	56.00	46.87	0.10	0.17	QP
33	1.898	46.78	-9.22	56.00	46.50	0.10	0.18	QP
34	1.898	41.45	-4.55	46.00	41.17	0.10	0.18	AVERAGE
35	1.959	37.23	-8.77	46.00	36.94	0.10	0.19	AVERAGE
36	1.959	45.40	-10.60	56.00	45.11	0.10	0.19	QP
37	2.012	40.05	-5.95	46.00	39.75	0.10	0.20	AVERAGE
38	2.012	46.58	-9.42	56.00	46.28	0.10	0.20	QP
39	2.121	44.42	-1.58	46.00	44.12	0.10	0.20	AVERAGE
40	2.121	48.13	-7.87	56.00	47.83	0.10	0.20	QP
41	2.175	49.16	-6.84	56.00	48.86	0.10	0.20	QP
42	2.175	44.48	-1.52	46.00	44.18	0.10	0.20	AVERAGE
43	2.229	48.74	-7.26	56.00	48.44	0.10	0.20	QP
44	2.229	41.67	-4.33	46.00	41.37	0.10	0.20	AVERAGE
45	2.500	40.27	-5.73	46.00	39.97	0.10	0.20	AVERAGE
46	2.500	48.81	-7.19	56.00	48.51	0.10	0.20	QP
47	3.642	46.69	-9.31	56.00	46.29	0.10	0.30	QP
48	3.642	39.99	-6.01	46.00	39.59	0.10	0.30	AVERAGE
49	4.247	44.56	-11.44	56.00	44.16	0.10	0.30	QP
50	4.247	36.48	-9.52	46.00	36.08	0.10	0.30	AVERAGE
51	4.836	43.01	-2.99	46.00	42.61	0.10	0.30	AVERAGE
52	4.836	47.20	-8.80	56.00	46.80	0.10	0.30	QP
53	5.106	46.77	-13.23	60.00	46.37	0.10	0.30	QP
54	5.106	42.38	-7.62	50.00	41.98	0.10	0.30	AVERAGE
55	6.627	47.57	-12.43	60.00	47.10	0.10	0.37	QP
56	6.627	43.53	-6.47	50.00	43.06	0.10	0.37	AVERAGE
57	9.451	46.78	-13.22	60.00	46.38	0.10	0.30	QP
58	9.451	42.12	-7.88	50.00	41.72	0.10	0.30	AVERAGE
59	12.498	49.96	-10.04	60.00	49.46	0.10	0.40	QP
60	12.498	44.30	-5.70	50.00	43.80	0.10	0.40	AVERAGE

## 4.2. Maximum Conducted Output Power Measurement

### 4.2.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

### 4.2.2. Measuring Instruments and Setting

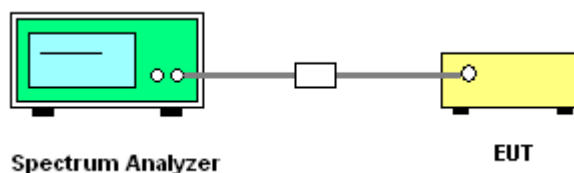
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz
VB	3000 kHz
Detector	rms
Trace	Max Hold
Sweep Time	Auto

### 4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Test was performed in accordance with Measurement of Digital Transmission Systems Operating under Section 15.247 March 23, 2005.
3. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

### 4.2.4. Test Setup Layout



### 4.2.5. Test Deviation

There is no deviation with the original standard.

### 4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



#### 4.2.7. Test Result of Maximum Conducted Output Power

<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Aric Li	<b>Configurations</b>	Draft n

##### Configuration Draft n MCS0 20MHz Ant. A

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	16.39	30.00	Complies
6	2437 MHz	16.27	30.00	Complies
11	2462 MHz	16.36	30.00	Complies

##### Configuration Draft n MCS0 20MHz Ant. C

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	16.47	30.00	Complies
6	2437 MHz	16.99	30.00	Complies
11	2462 MHz	17.08	30.00	Complies

##### Configuration Draft n MCS8 20MHz Ant. A + Ant. C

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	19.44	30.00	Complies
6	2437 MHz	19.66	30.00	Complies
11	2462 MHz	19.75	30.00	Complies

**Configuration Draft n MCS8 40MHz Ant. A**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	15.38	30.00	Complies
6	2437 MHz	16.23	30.00	Complies
9	2452 MHz	15.77	30.00	Complies

**Configuration Draft n MCS8 40MHz Ant. C**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	15.66	30.00	Complies
6	2437 MHz	16.75	30.00	Complies
9	2452 MHz	16.01	30.00	Complies

**Configuration Draft n MCS8 40MHz Ant. A + Ant. C**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	18.53	30.00	Complies
6	2437 MHz	19.51	30.00	Complies
9	2452 MHz	18.90	30.00	Complies

<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Aric Li	<b>Configurations</b>	802.11b/g

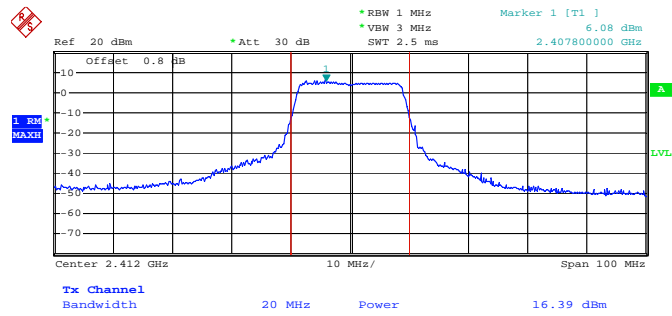
**Configuration IEEE 802.11b Ant. C**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	18.61	30.00	Complies
6	2437 MHz	18.52	30.00	Complies
11	2462 MHz	18.62	30.00	Complies

**Configuration IEEE 802.11g Ant. C**

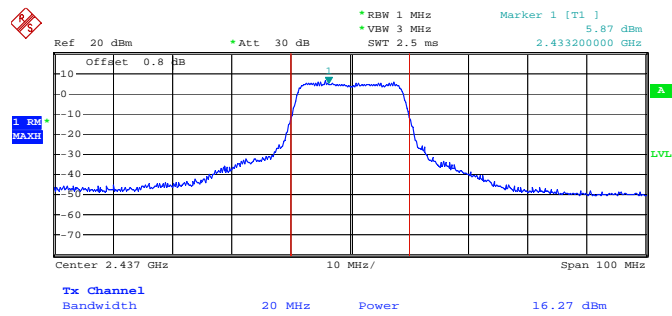
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	16.33	30.00	Complies
6	2437 MHz	16.22	30.00	Complies
11	2462 MHz	16.50	30.00	Complies

**Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. A / 2412 MHz**



Date: 30.MAY.2008 17:09:49

**Conducted Output Power Plot on Configuration Draft n MCS8 20MHz Ant. A / 2437 MHz**



Date: 30.MAY.2008 17:13:27





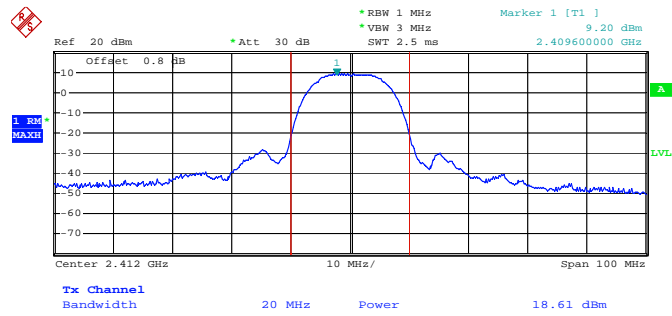






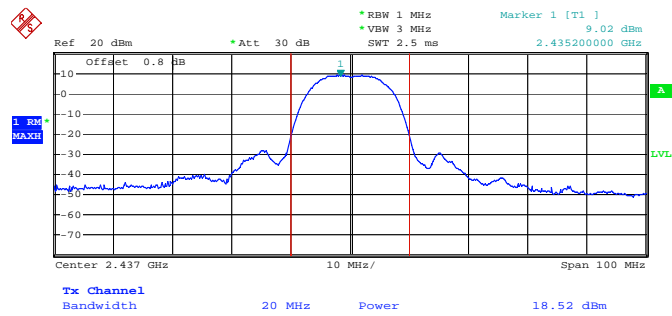


**Conducted Output Power Plot on Configuration IEEE 802.11b Ant. C / 2412 MHz**



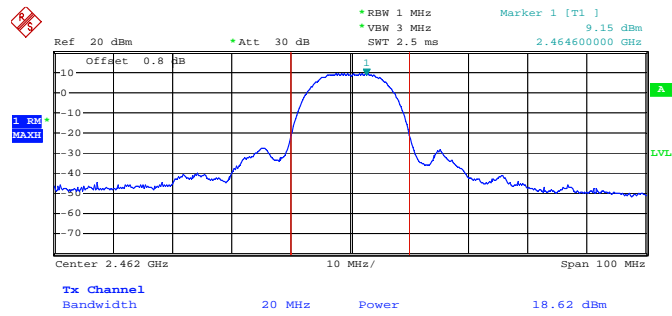
Date: 30.MAY.2008 17:02:06

**Conducted Output Power Plot on Configuration IEEE 802.11b Ant. C / 2437 MHz**



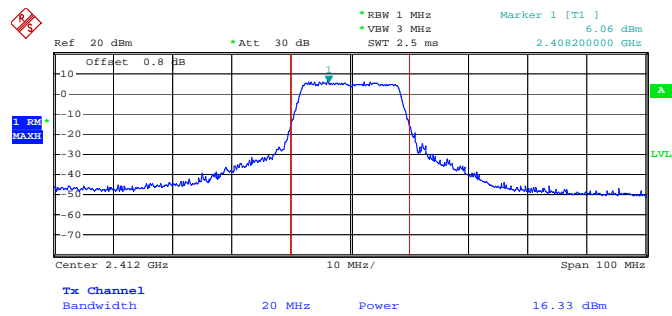
Date: 30.MAY.2008 17:02:49

**Conducted Output Power Plot on Configuration IEEE 802.11b Ant. C / 2462 MHz**



Date: 30.MAY.2008 17:03:22

**Conducted Output Power Plot on Configuration IEEE 802.11g Ant. C / 2412 MHz**



Date: 30.MAY.2008 17:06:44



### 4.3. Power Spectral Density Measurement

#### 4.3.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

#### 4.3.2. Measuring Instruments and Setting

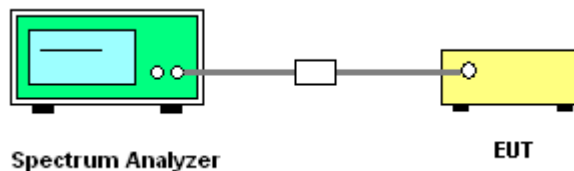
Please refer to section 5 of equipments list in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	1.5MHz
RB	3 kHz
VB	30 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	500s

#### 4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser.
2. Set RBW of spectrum analyzer to 3kHz and VBW to 30kHz. Set Detector to Peak, Trace to Max Hold.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum.
4. Set the span to 1.5MHz and the sweep time to 500s and record the maximum peak value.
5. Measuring multiple antennas, the connector is required to link with spectrum analyser through a combiner.

#### 4.3.4. Test Setup Layout



#### 4.3.5. Test Deviation

There is no deviation with the original standard.

#### 4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.3.7. Test Result of Power Spectral Density

<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Sam Chen	<b>Configurations</b>	Draft n

##### Configuration Draft n MCS8 20MHz Ant. A + Ant. C

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-11.87	8.00	Complies
6	2437 MHz	-10.42	8.00	Complies
11	2462 MHz	-11.48	8.00	Complies

##### Configuration Draft n MCS8 40MHz Ant. A + Ant. C

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	-13.96	8.00	Complies
6	2437 MHz	-12.35	8.00	Complies
9	2452 MHz	-13.16	8.00	Complies

<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Sam Chen	<b>Configurations</b>	802.11b/g

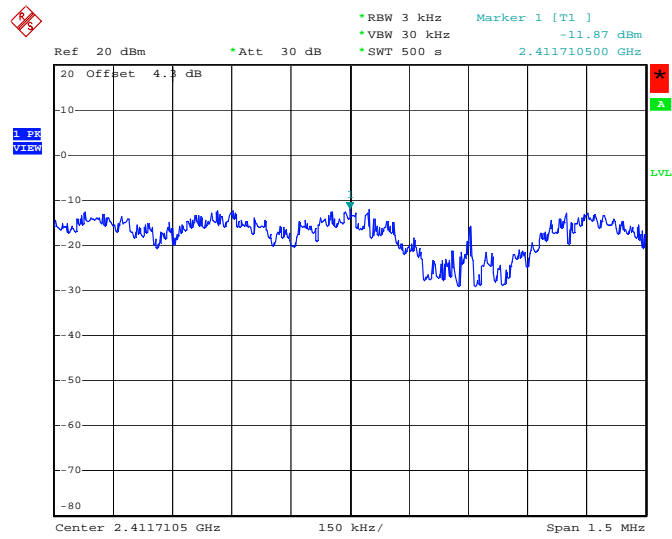
**Configuration IEEE 802.11b Ant. C**

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-12.33	8.00	Complies
6	2437 MHz	-12.29	8.00	Complies
11	2462 MHz	-12.11	8.00	Complies

**Configuration IEEE 802.11g Ant. C**

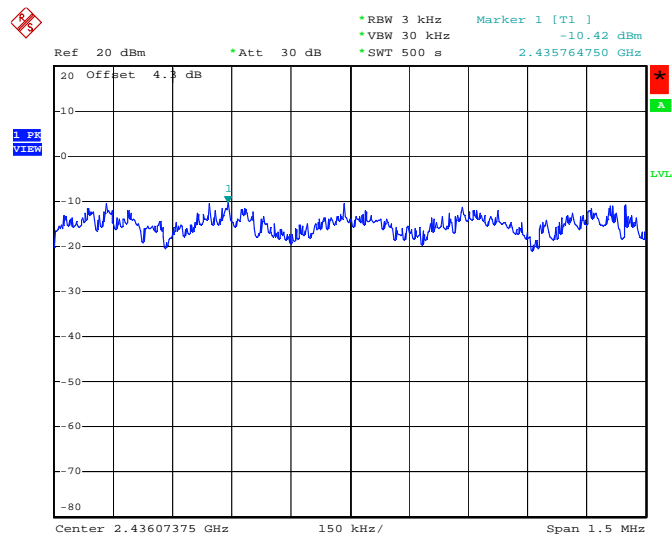
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-14.90	8.00	Complies
6	2437 MHz	-15.11	8.00	Complies
11	2462 MHz	-14.99	8.00	Complies

### Power Density Plot on Configuration Drafft n MCS8 20MHz Ant. A + Ant. C / 2412 MHz



Date: 30.MAY.2008 17:28:01

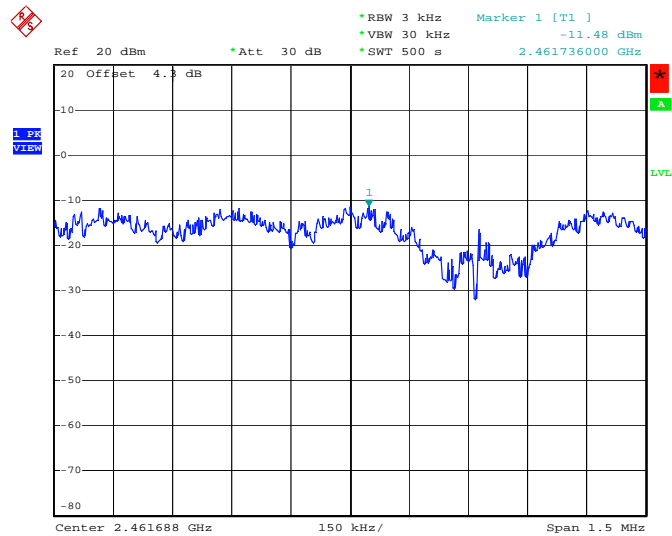
### Power Density Plot on Configuration Drafft n MCS8 20MHz Ant. A + Ant. C / 2437 MHz



Date: 30.MAY.2008 17:28:56

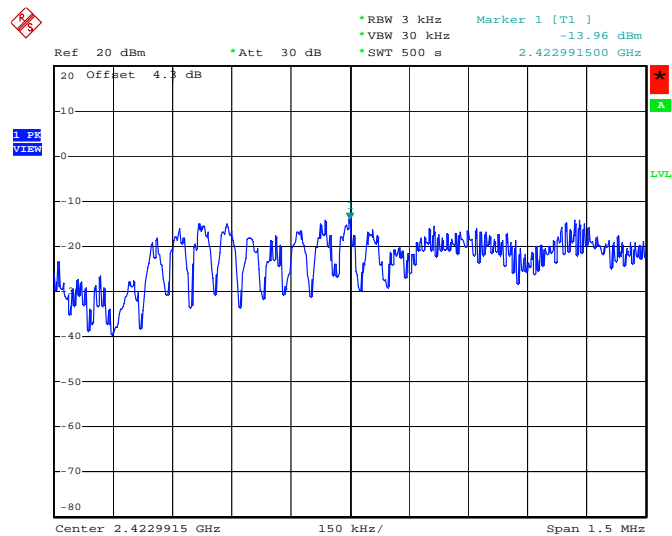


### Power Density Plot on Configuration Drafft n MCS8 20MHz Ant. A + Ant. C / 2462 MHz



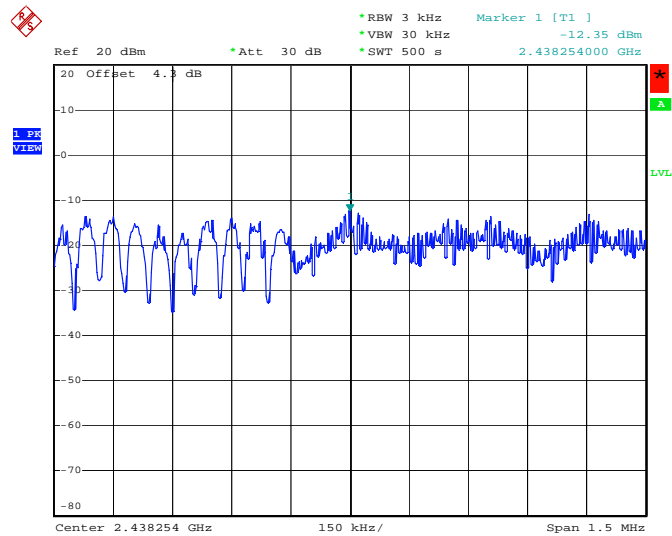
Date: 30.MAY.2008 17:29:42

### Power Density Plot on Configuration Drafft n MCS8 40MHz Ant. A + Ant. C / 2422 MHz



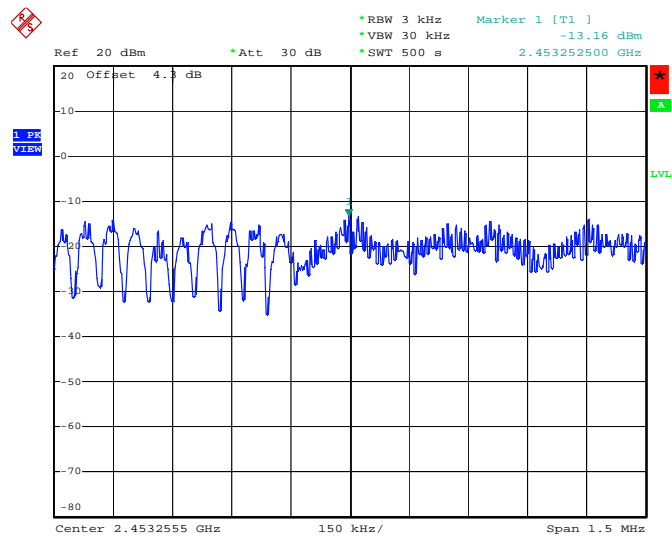
Date: 30.MAY.2008 17:26:43

**Power Density Plot on Configuration Drafft n MCS8 40MHz Ant. A + Ant. C / 2437 MHz**



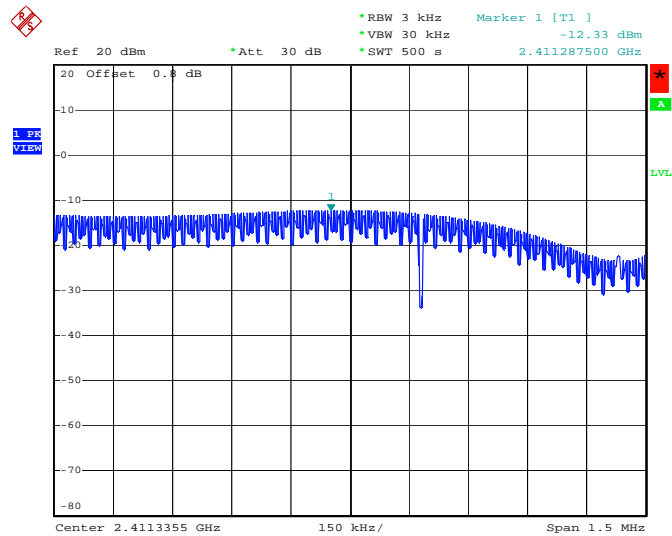
Date: 30.MAY.2008 17:25:47

**Power Density Plot on Configuration Drafft n MCS8 40MHz Ant. A + Ant. C / 2452 MHz**



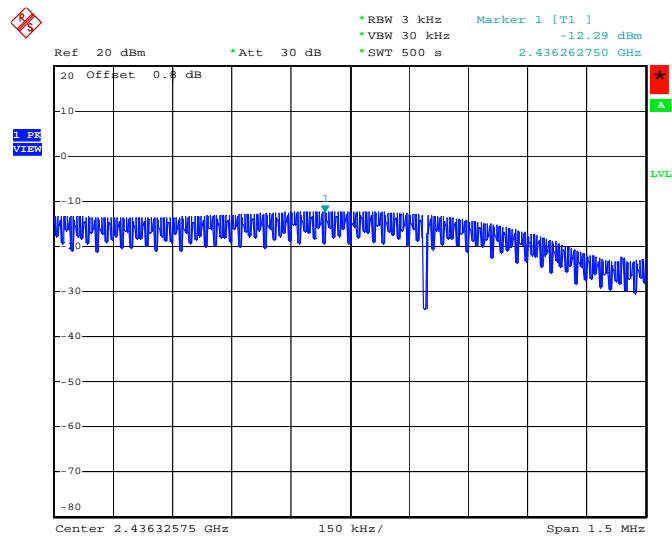
Date: 30.MAY.2008 17:24:48

**Power Density Plot on Configuration IEEE 802.11b Ant. C / 2412 MHz**



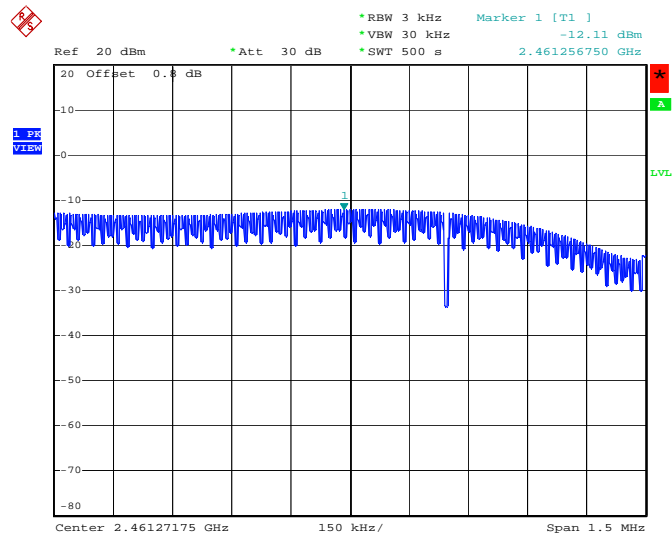
Date: 30.MAY.2008 17:35:14

**Power Density Plot on Configuration IEEE 802.11b Ant. C / 2437 MHz**



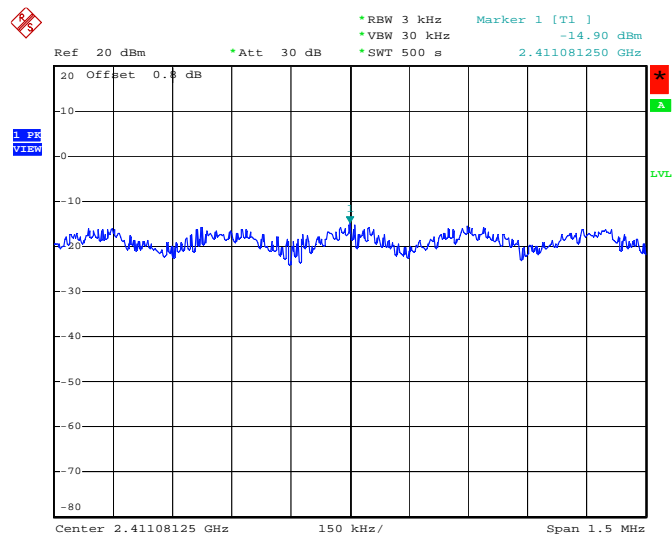
Date: 30.MAY.2008 17:36:04

### Power Density Plot on Configuration IEEE 802.11b Ant. C/ 2462 MHz



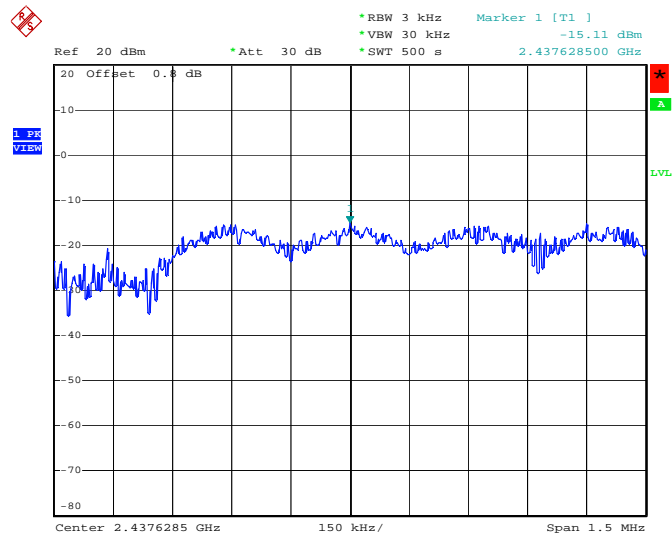
Date: 30.MAY.2008 17:36:48

### Power Density Plot on Configuration IEEE 802.11g Ant. C / 2412 MHz



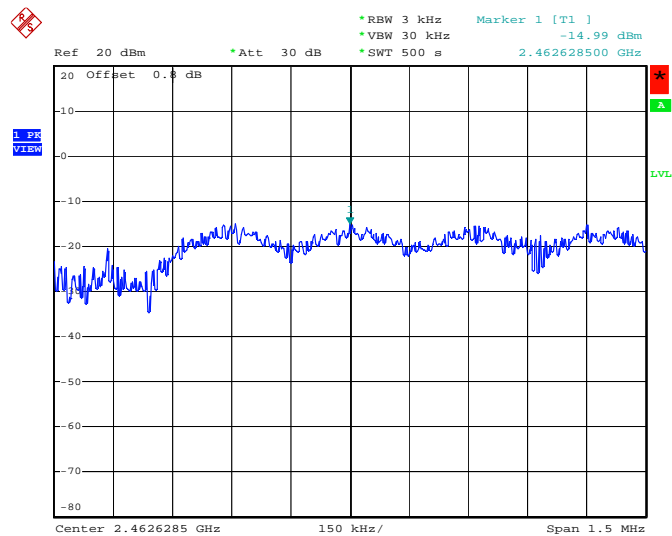
Date: 30.MAY.2008 17:34:12

### Power Density Plot on Configuration IEEE 802.11g Ant. C / 2437 MHz



Date: 30.MAY.2008 17:33:22

### Power Density Plot on Configuration IEEE 802.11g Ant. C / 2462 MHz



Date: 30.MAY.2008 17:32:23